

Two Approaches to Rehabilitation of Metal Roofing at Wheeler Army Airfield Hawaii

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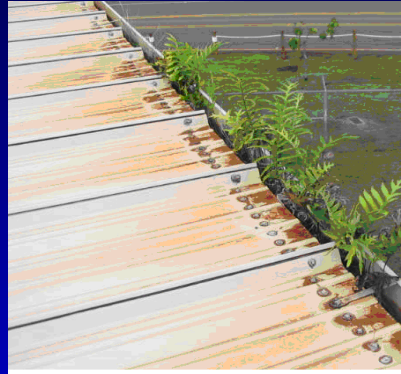
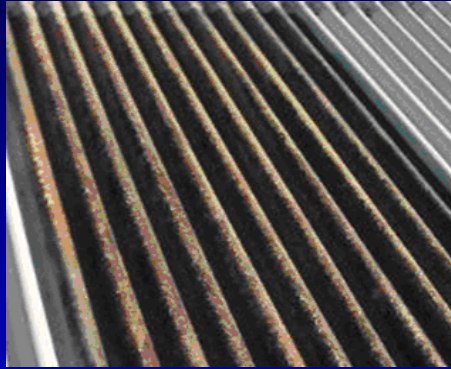


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Corrosion Problem

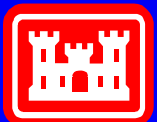


- Standing seam metal roofs (SSMR) comprise 80% of DoD new roofing
 - 1980's roofs reaching end of service life
- Early coatings with performance problems
 - Not adequate
 - Not “cool”
- Corrosion around panel-penetrating fasteners
 - Corrosion
- Improper flashing of roof penetrations



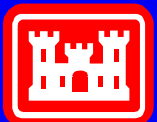
Objective

- To demonstrate and implement rehabilitation technologies to extend service life of existing metal roofs identified for replacement due to corrosion related problems
- Two metal roofs at Wheeler Army Airfield, Hawaii
- Two corrosion mitigation technologies

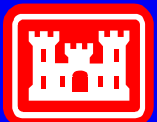


Approach/Technologies

- Polyurea coating over existing metal roof
- New metal roofing system over existing metal roof



Wheeler Army Airfield



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Polyurea Coating Restoration

Building 118 - Barracks

- Corrugated metal panel
- 20,000 SF
- 15 + years old

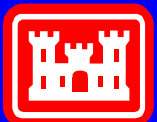


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Existing Conditions

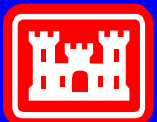
- Overlay with coating
- Some rusting
- Persistent leaking



Polyurea Coating Restoration

Demonstration Metrics

- Must meet established parameters
- Fifteen year warranty
- Must effectively seal around roof penetrations and seams
- Aesthetically acceptable to customer



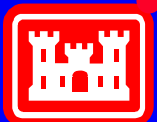
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Polyurea Roof Coating



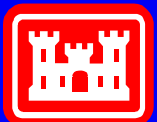
- Solids 98% by weight
- Tensile (ASTM D-412) 1800 psi
- Elongation (ASTM D-412) 500%
- Permanent Set (ASTM D-412) 10% max.
- Hardness Shore A (ASTM D-2240) 60 ± 3
- Tear Resistance (ASTM D-624, Die C) 250 pli
- Water Vapor Perm. (ASTM E-96, BW) 0.025 perm In.



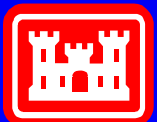
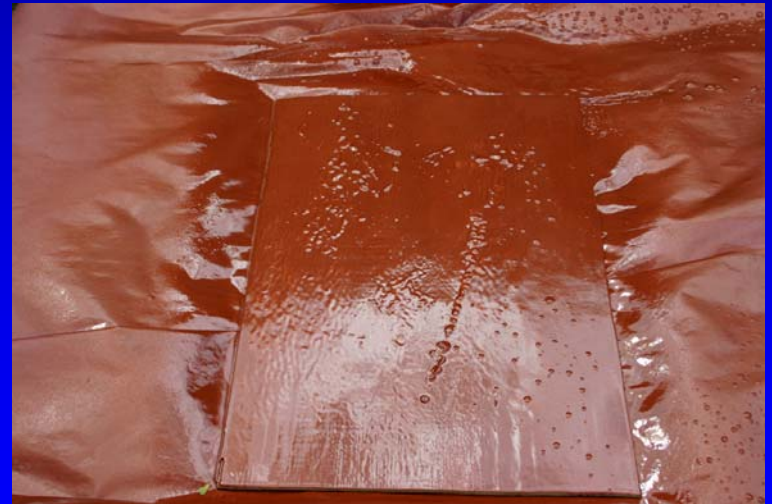
Polyurea Coating Restoration

Preparation

- Pre-work inspection
 - Only minor, peeling, flaking
 - Some missing seam sealant
- Pressure washing
 - Water\bleach\mildewcide
- Cleaning of gutters, sealing of open joints with polyurethane sealant



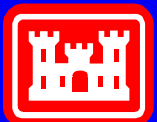
Polyurea Coating Restoration Training



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Polyurea Coating Restoration **Application**

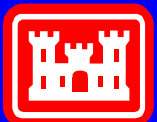


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Polyurea Coating Restoration

Finished Appearance

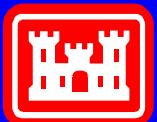
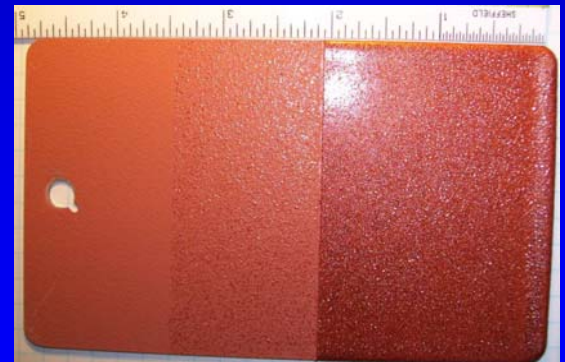


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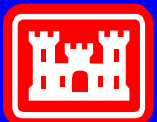
Lessons Learned

- Parking/personnel access to building must be well coordinated
- Maintain fluid lines at established elev. temps.
- Overspray needs to be minimized
 - Gun tip, backpressure & fluid temp.
 - Applicator standoff distance
 - Application angle
 - wind



Project Cost Savings

- Estimated Cost for Tear-off and Replacement
 - \$420,000
 - 30-year service life
- Rehabilitation using polyurea-hybrid coating
 - \$118,000
 - 15-year service life



SSMR Re-cover on Existing Metal System

Building 835 – Bowling Center

- Standing seam metal roof
- 10,000 SF
- 22 years old



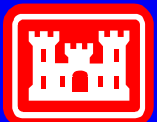
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SSMR Re-cover on Existing Metal System

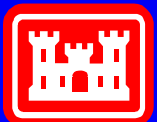
Existing Conditions

- Severe paint delamination
- Areas of rusting on panel surfaces
- Poor detailing of roof penetrations



SSMR Re-cover on Existing Metal System

Existing Conditions



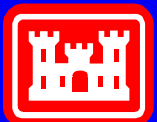
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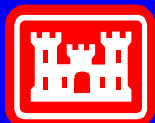
Demonstration Metrics

- Sub purlins used to re-cover existing metal roof.
- Must meet CERL's accepted parameters,
- Must have a minimum 2 mil finish.
- Must meet wind uplift requirements (ASTM E1592)
- Flashing details must provide effective seal around vents, stack and seams.
- Must be aesthetically acceptable to DPW and the garrison's senior leadership.



SSMR Re-cover on Existing Metal System

Retrofit Subpurlin System Roof Hugger™



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Surface Preparation

- Pressure wash surface

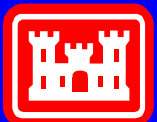


- Apply rust inhibitors
- Remove existing fascia and gutters



SSMR Re-cover on Existing Metal System

Application

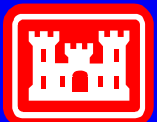


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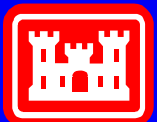


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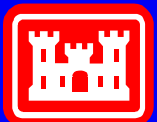


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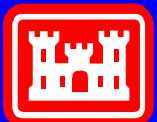


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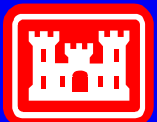
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SSMR Re-cover on Existing Metal System

Lessons Learned

- Re-cover installation (vs. replace) greatly reduces work space requirements and minimizing disruptions
- Mock-up and testing of fascia and gutter prior to initiating work can result in improved detailing
- To minimize “oil canning”, consider reducing panel width to 12” and or use lighter color



Rehabilitation of Metal Roofing

Recommendations

- Continue to survey both roofs to determine service life extension
- Collect exposure samples during the next two years to assess performance
- Based on assessments, develop guide specifications, manuals and standards for use by the DoD

